Applicator

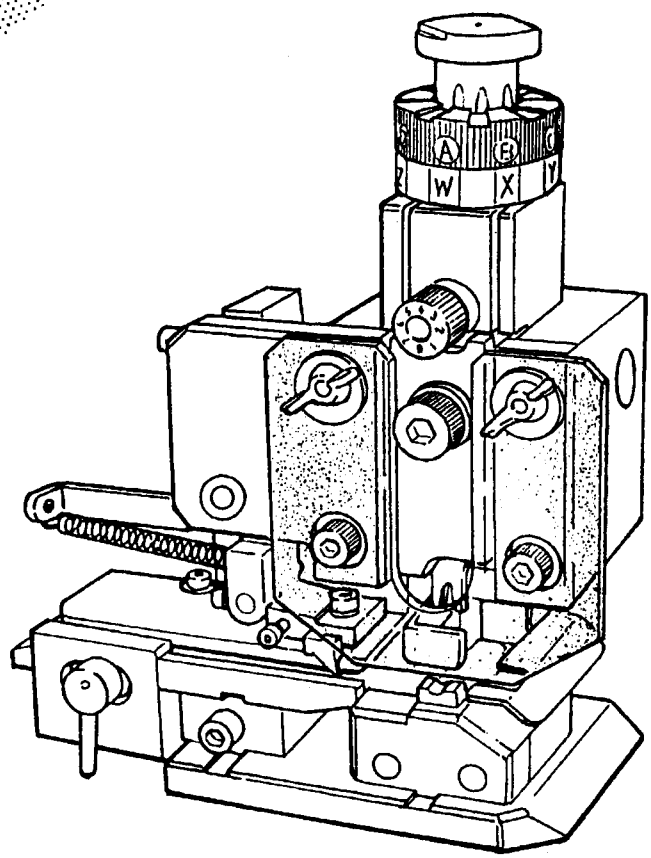
Model AP105

Main unit of applicable crimping machine

Model CM-105

CAUTION :
Be sure to read this Instruction Manual carefully before using it to secure safety in operation. In addition, save this Instruction Manual so that it is available whenever necessary for review.

INSTRUCTION MANUAL



HIROSE ELECTRIC CO., LTD.

FOR SAFE OPERATION

Because of the machine's design, there is always a possibility of contact with moving parts. The operators of the machine and the maintenance personnel who are in charge of maintenance and repair work are required to read the following **SAFETY INSTRUCTIONS** so as to avoid injury.

To fully understand the descriptions given in this Instruction Manual and the warning labels attached on the machine, the warning messages are used in accordance with the below-stated classification. Please be sure to thoroughly understand the messages and follow the instructions.

(I) Description of warning messages

DANGER	**Used in the case where it is assumed that misuse of the machine will expose the operator to immediate danger of major injury or death.**
WARNING	**Used in the case where it is assumed that misuse of the machine can expose the operator to danger of major injury or death.**
CAUTION	**Used in the case where it is assumed that misuse of the machine can expose the operator to danger of injury and can cause damage to property.**

*** Determine the degree of impairment referring to the below-stated classification.**

Major injury : Indicates the loss of eyesight, wounds, burns (hyperthermal and hypothermal burns), electric shocks, fracture of a bone, poisoning, etc. requiring emergency of extended medical care.

Injury (Minor injury) : Indicates wounds, burns, electric shocks, etc. requiring medical treatment.

Damage to property : Indicates damage to the machinery and or the surrounding area.

SAFETY INSTRUCTIONS

⚠ CAUTION

Basic safety instructions

1. Be sure to read this Instruction Manual and all the instructions and other materials supplied with the unit as accessories. Save this Instruction Manual and make it available for review whenever necessary.

Safety device and warning labels

1. To avoid possible accidents due to lack of the safety device, be sure to operate the machine after ascertaining that the safety device is properly installed at the predetermined position. Refer to page iii for detailed description of the safety device.
2. Once the safety device is detached from the machine, replace it to its original position and check to be sure that it functions properly.

Application

1. This machine shall only be used for its originally intended purpose while following the instructions specified in this Instruction Manual.
2. Modifications to this machine is prohibited. We assume no responsibility for accidents resulting from modifications.

Training

1. To prevent possible accidents caused by unfamiliarity with the operation of the machine, the machine shall only be allowed to be used by the operators who have been trained for proper operation and provided with sufficient knowledge of safe operation by the employee. For this purpose, the employer shall establish a training plan and implement it for the operators beforehand.

Working wear

1. To protect against possible accidents resulting in personal injury by your cloths being caught in the machine, be sure wear a work uniform and securely fasten buttons on the sleeve cuffs and close the zipper on the top center plait of the uniform, if any. Avoid wearing loosely fitted clothing.
2. The operator should fasten hair securely to avoid his/her hair from being caught in the machine.
3. The operator should wear close toe, rubber sole shoes.

SAFETY INSTRUCTIONS IN EACH CATEGORY OF WORK FOLLOWING THE DELIVERY OF THE MACHINE

Transportation

1. The machine shall be moved in such a way that secures safety avoid falling and dropping.
2. To protect against unexpected accidents or drop accidents, the machine shall be repackaged, if necessary, to achieve the originally delivered state or better. Prior to repackaging, wipe off oil gathering on the machine.

Unpacking

1. The machine is shipped in a corrugated cardboard box. Be sure to take the machine out from the box while cautiously avoiding dropping the machine.

Lubrication

1. Use oil of the kind designated by us or an equivalent for the machine.
2. In the event that oil should get in your eye or contact your skin, immediately wash to remove it to protect against irritations and rashes.
3. In the event that you should swallow oil by mistake, immediately consult a doctor to prevent diarrhea and emesis.

Maintenance

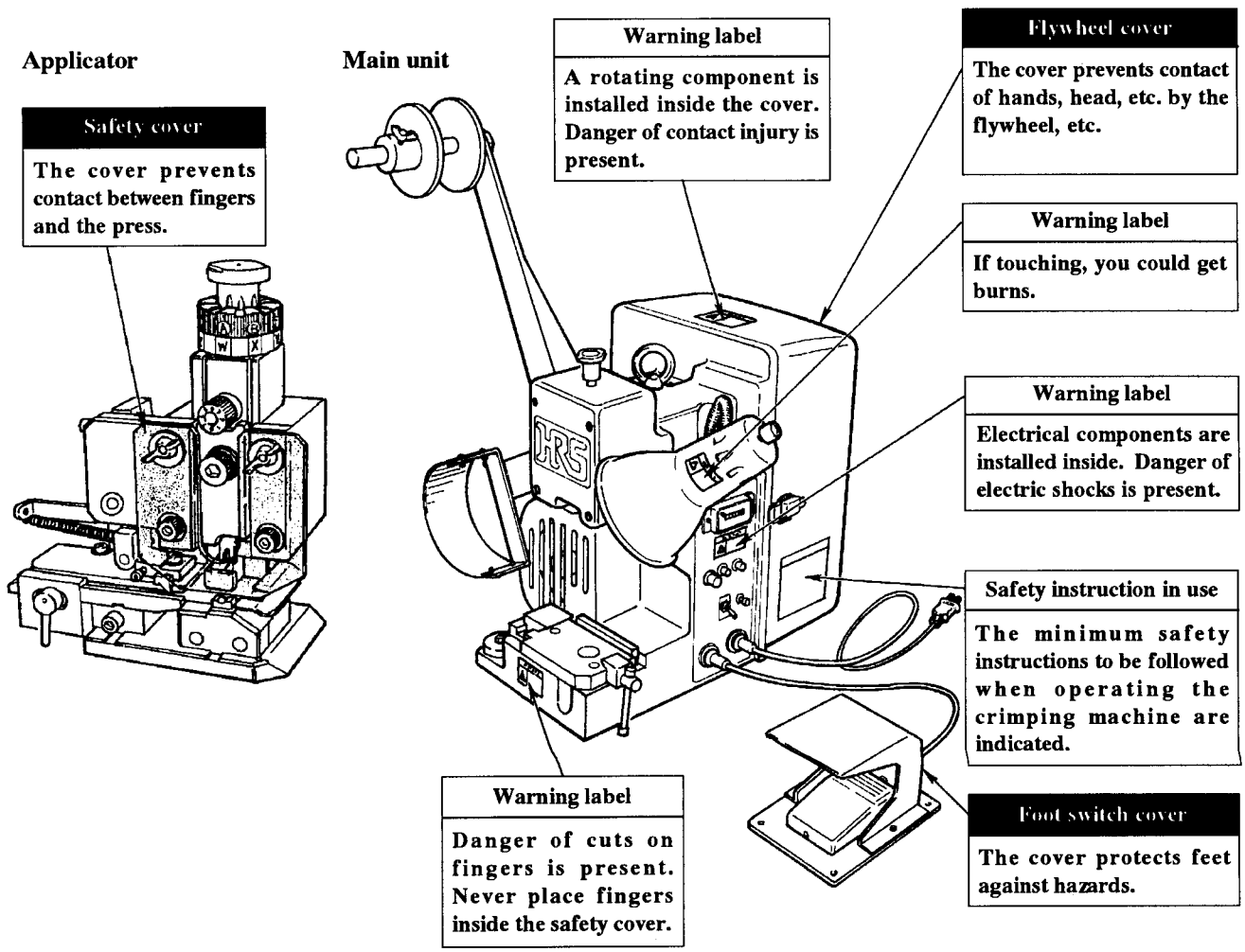
1. To prevent possible accidents caused by unfamiliarity with the operation of the machine, repair and adjustment of the machine shall be conducted only by maintenance personnel who have full knowledge of the machine. Any repair and adjustment beyond the range covered by the instructions given in this Instruction Manual is prohibited. We assume no responsibility for accidents caused by improper repair or adjustment or the use of non-genuine part(s).
2. To protect against personal injury, check to be sure that screws and nuts are not loosened after the completion of repair/ adjusting works and replacement of parts.
3. Periodically clean the machine as long as it is commissioned. To prevent possible accidents caused by abrupt start of the machine during cleaning, be sure disconnect the machine prior to cleaning.
4. In the event that your machine fails to perform normally after repair or adjusting immediately stop operation and contact us for service so as to protect against personal injury.

SAFETY INSTRUCTIONS TO BE FOLLOWED WHEN USING THE APPLICATOR MODEL AP105

⚠ CAUTION	**1. To avoid possible accidents resulting in personal injury caused by being caught in the moving parts of the machine, extreme caution has to be taken to keep your hands, head and fingers away from the moving parts and the area surrounding them. Also, do not place any matter that is not necessary in the use of the machine nesr by.**

SAFETY DEVICE

For the machine and the safety device of which configurations are given below, the machine is made to specifications intended for Japanese home market and the safety device is mounted on and supplied with the machine. The configurations may differ with destinations and specifications.


Applicator
Main unit
Safety cover
The cover prevents contact between fingers and the press.
Warning label
A rotating component is installed inside the cover. Danger of contact injury is present.
Flywheel cover
The cover prevents contact of hands, head, etc. by the flywheel, etc.
Warning label
If touching, you could get burns.
Warning label
Electrical components are installed inside. Danger of electric shocks is present.
Safety instruction in use
The minimum safety instructions to be followed when operating the crimping machine are indicated.
Foot switch cover
The cover protects feet against hazards.
Warning label
Danger of cuts on fingers is present. Never place fingers inside the safety cover.

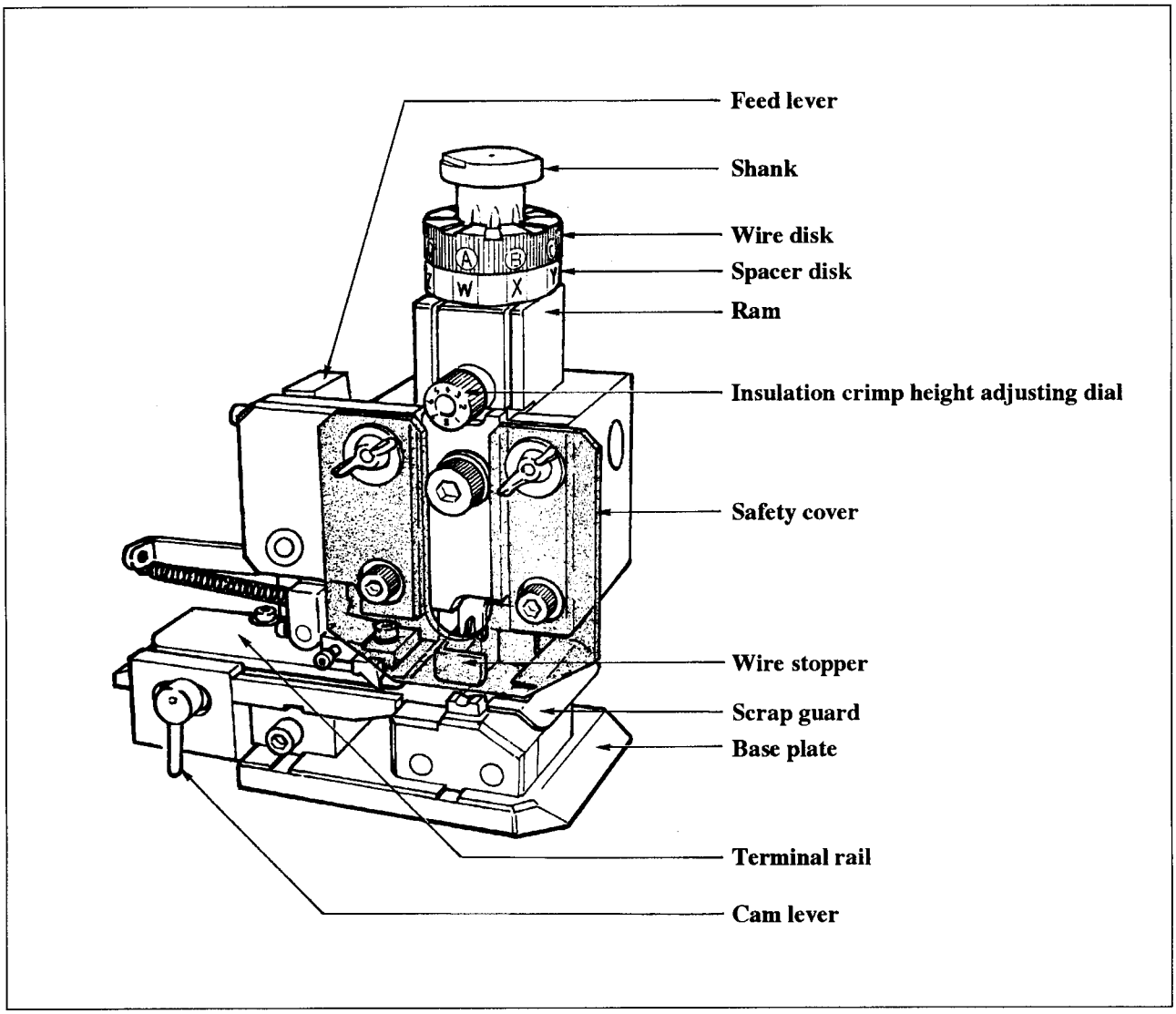
CONTENTS

1. Specifications 1
2. Configuration 1
3. Attaching/detaching the applicator 2
(1) Attaching the applicator to the main unit of the crimping machine 2
(2) Detaching the applicator 2
4. Crimping operation 3
4-1. Attaching/detaching the reel terminal 3
(1) Attaching the reel terminal to the main unit of the crimping machine 3
(2) Detaching the reel terminal from the main unit of the crimping machine 3
(3) Attaching the terminal to the applicator 3
(4) Detaching the terminal from the applicator 4
4-2. Preparing an electric cable 4
(1) Processing the terminal 4
4-3. Making preparation for crimping operation 4
(1) How to conduct crimping operation 4
(2) How to adjust the position of the terminal 5
(3) How to adjust the crimp height 6
5. Crimping quality 7
5-1. Crimping conditions 7
5-2. Crimping quality standards 7
6. Maintenance 8
(1) Lubrication 8
(1)-1. Sliding section of the ram 8
(1)-2. Sliding section of the terminal feed mechanism 8
(2) Routine maintenance and inspection 8
(3) Replacing the expendable parts 9
(3)-1. Replacing the crimper 9
(3)-2. Replacing the anvil 9
(4) Expendable parts 9
7. Troubleshooting 10
(1) Troubles with respect to functions of the applicator 10
(2) Troubles with respect to crimping quality 10
8. Appendix 11
(1) Major component names 11
(2) Expansion view 12

1. Specifications

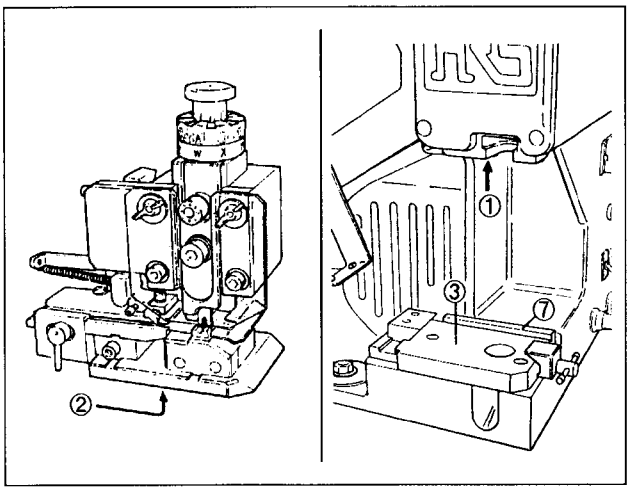
Item	Specification
Adjustment of the wire crimp height	Adjustable in 16 stages by turning dial
Adjustment of the insulation crimp height	Adjustable in 8 stages by turning dial
Outside dimensions (with the ram placed in its lower dead center)	170 mm (length, height) x 170 mm (width) x 80 mm (depth)
Weight	4 kg
Main unit of applicable crimping machine	Model CM-105

2. Configuration



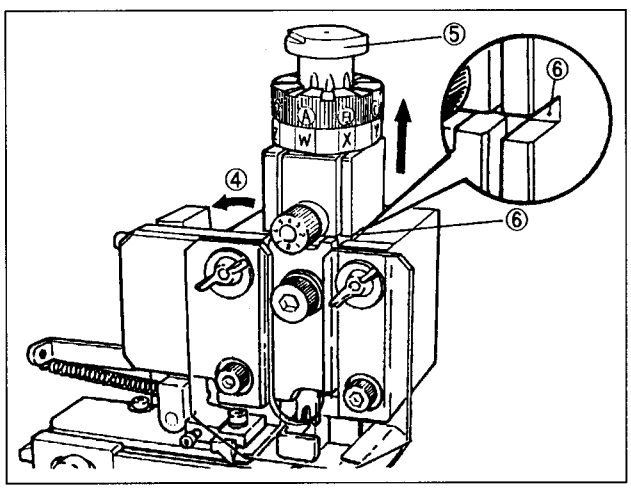
3. Attaching/detaching the applicator

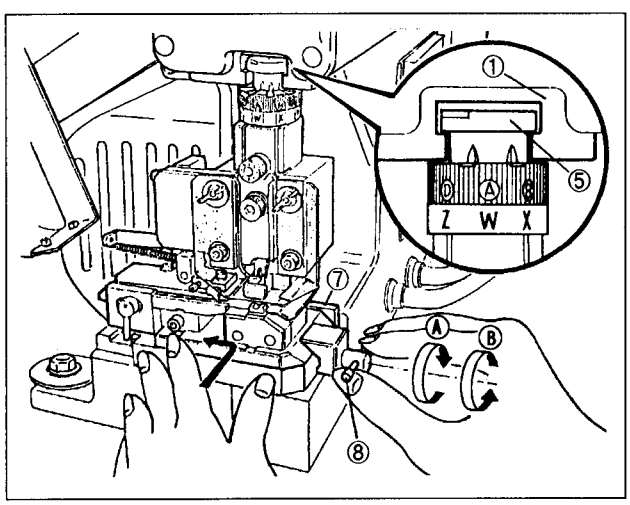
CAUTION :
To protect against possible accidents due to abrupt start of the machine, start your work after disconnecting the power to the main unit of the crimping machine.



(1) Attaching the applicator to the main unit of the crimping machine

1) Turn off the power to the main unit of the crimping machine.
2) To attach the applicator to the main unit of the crimping machine, be sure to check the performance before putting the machine into service referring to the Instruction Manual for the main unit of the crimping machine, Model CM-105 to make sure that the ram is in its top dead center ①.
3) Thoroughly remove dust and stains from bottom face ② of the applicator base and top face (contact plane) ③ of the bolster plate.
4) Keeping terminal feed lever ④ held tilted in the direction of the arrow, lift shank ⑤ (do not draw it out) to fit it in slit ⑥ on the main unit.





5) Place the applicator on the top face of bolster plate ③ and slide it forward until it is pressed against stopper block ⑦.
6) Press clamp lever ⑧ in the direction of arrow Ⓐ until it is secured.
   At this time, make sure that shank ⑤ is attaching on ram ①.

(Caution) This completes the installation of the applicator. Never carry out a false placement in this state.

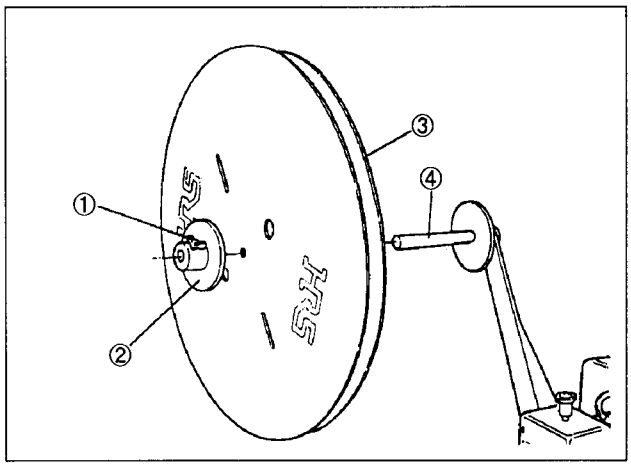
(2) Detaching the applicator

1) Loosen clamp lever ⑧ by turning it in the direction of arrow Ⓑ and pull the applicator until it comes off.

4. Crimping operation

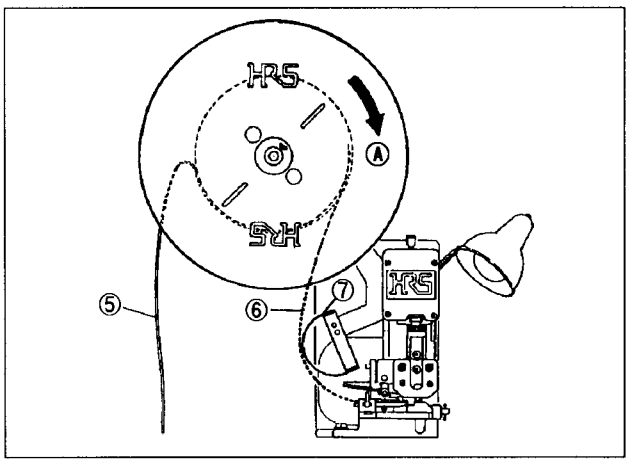
CAUTION :
To protect against possible accidents due to abrupt start of the machine, start your work after disconnecting the power to the main unit of the crimping machine.

4-1. Attaching/detaching the reel terminal



(1) Attaching the reel terminal to the main unit of the crimping machine

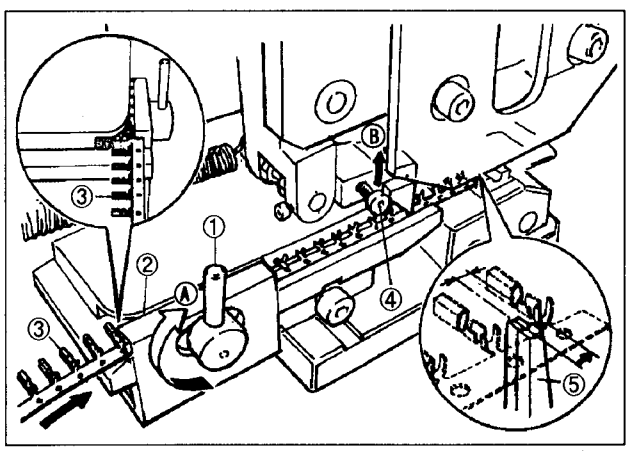
1) Loosen thumb-screw ①, remove flange ②, and pass reel terminal ③ over reel shaft ④.
2) Re-place flange ②, lightly press it and re-tighten thumb-screw ① to the correct position.



3) Turning reel terminal ③ in the direction of arrow Ⓐ, draw out terminal ⑥ together with paper tape ⑤.
4) Insert terminal ⑥ into the applicator from terminal guide ⑦ through the left-hand side of the main unit of the crimping machine.

(2) Detaching the reel terminal from the main unit of the crimping machine

1) Detach the reel terminal following the same procedure as that taken to attach it.

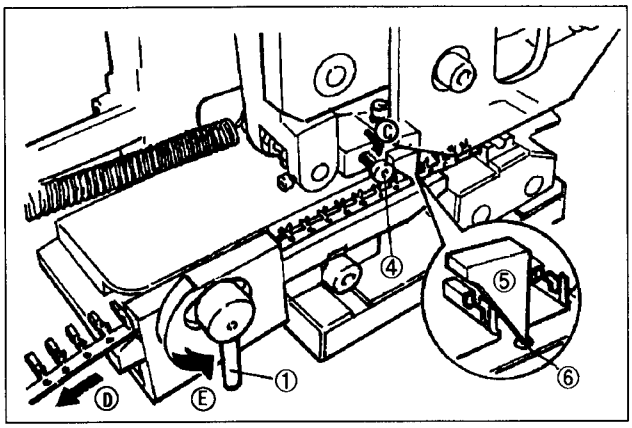


(3) Attaching the terminal to the applicator

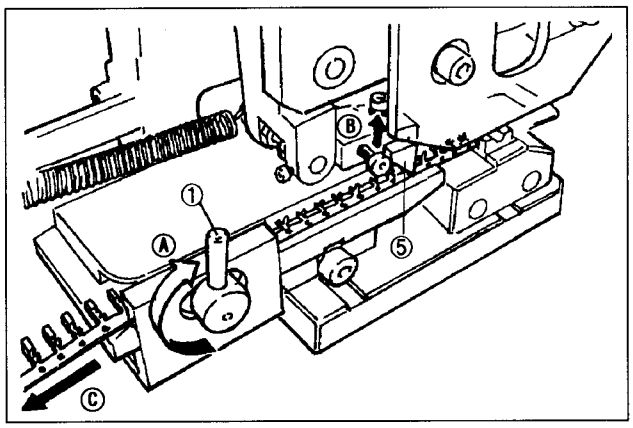
1) Turning cam lever ① in the direction of arrow Ⓐ, insert terminal ③ along terminal guide ②.

(Caution) Take care to avoid paper tape from entangling around the terminal.

2) Furthermore, lift screw ④ in the direction of arrow Ⓑ, and insert the terminal into the applicator until it goes slightly beyond just above anvil ⑤ in terms of the rightward direction.



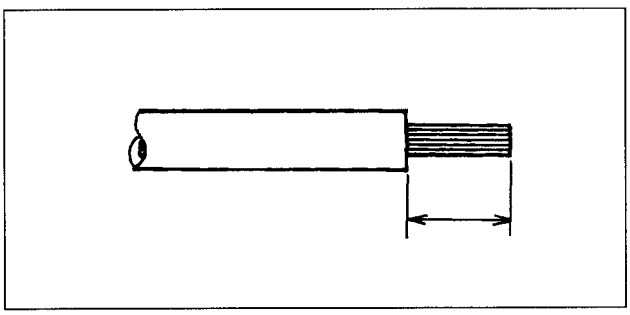
3) Lower screw ④ in the direction of arrow Ⓒ. Check to be sure that the top of gathering pallet ⑤ fits in pilot hole ⑥ in the terminal carrier.
Draw the reel terminal slightly in the direction of arrow Ⓓ and turn cam lever ① in the direction of arrow Ⓔ.
This completes the installation of the terminal.



(4) Detaching the terminal from the applicator

Turn cam lever ① in the direction of arrow Ⓐ and lift gathering pallet ⑤ in the direction of arrow Ⓑ. Then, draw out the terminal in the direction of arrow Ⓒ until it comes off.

4-2. Preparing an electric cable

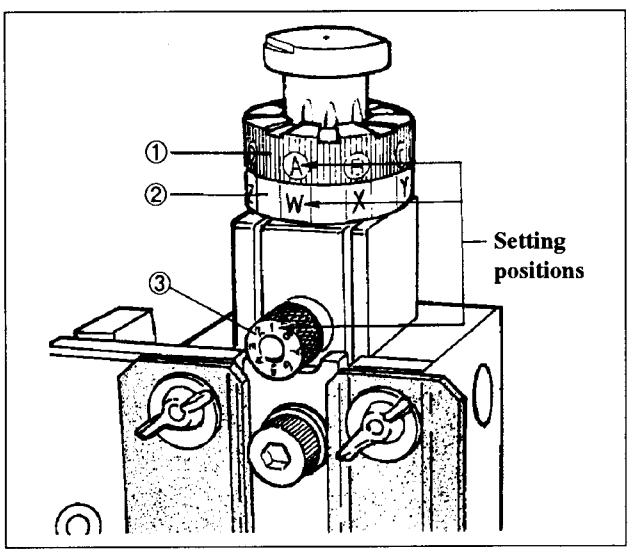


(1) Processing the terminal

1) Be sure to strip the covering at the top of the electric cable in prior. (Refer to the stripping length given in "5. Crimping quality.")
2) When stripping the covering, carefully avoid the cable core from breaking, being nicked, loosening and bending.

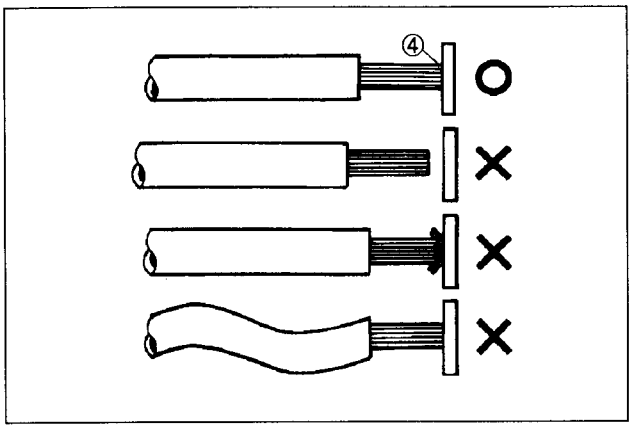
4-3. Making preparation for crimping operation

CAUTION :
To protect against possible accidents due to abrupt start of the machine, start your work after disconnecting the power to the main unit of the crimping machine.



(1) How to conduct crimping operation

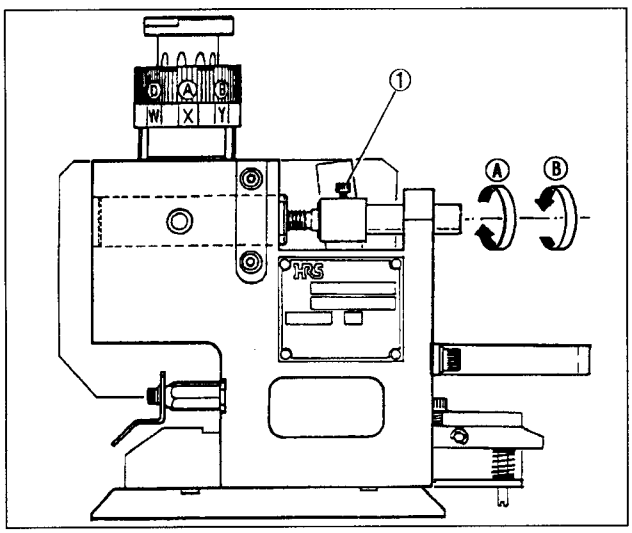
1) Set wire disk ①, spacer disk ② and insulation crimp height adjusting dial ③ as illustrated to the positions same as shown in the sketch on the left (A-W-1).



2) Connect the power plug of the main unit of the crimping machine to the power receptacle and turn on the main power switch.
3) Lightly press the stripped end of the electric cable against wire stopper ④ at a position that is almost just above the terminal.

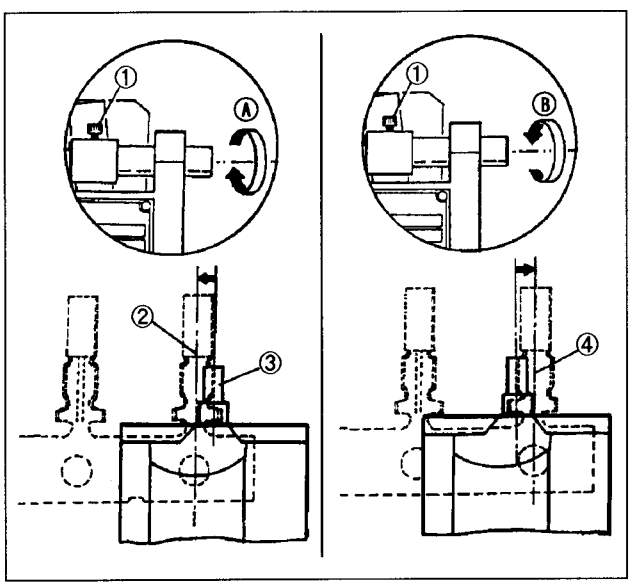
(Caution) If crimping is carried out with the electric cable separated from wire stopper ④ or excessively pressed against it, crimping quality deficiencies can result.

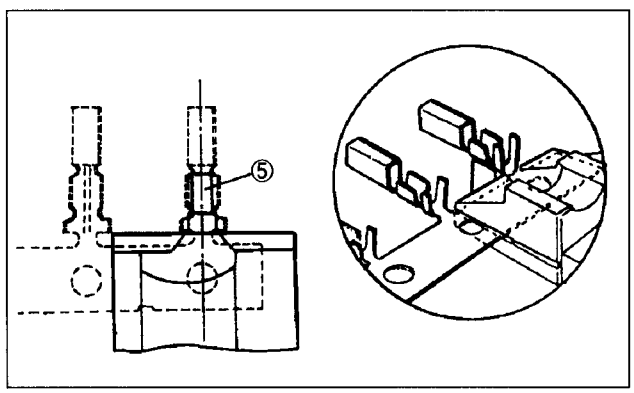
4) Depress the foot switch.
   Then, crimping performance is carried out by the up-and-down movement of the applicator ram every time the ram unit of the crimping machine makes an up-and-down movement.

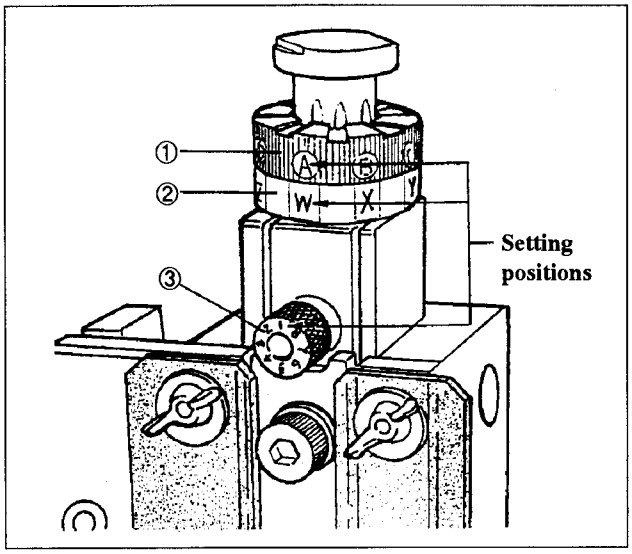


(2) How to adjust the position of the terminal

1) Loosen pivot block fixing screw ① with the terminal set in position.
2) If terminal ② is situated on the left of anvil ③, turn the feed adjusting shaft in the direction of arrow Ⓐ. If the terminal is situated on the right ④, turn it in the direction of arrow Ⓑ.
3) Once the terminal is brought to just above ⑤ the anvil, tighten fixing screw ①.







(3) How to adjust the crimp height

(Caution) To carry out crimping operation, refer to the description of operation given in the Instruction Manual for the main unit of the crimping machine, Model CM-105. In addition, check to be sure that the crimp terminal is attached to the correct position.

1) Check the crimp height requirement for the electric cable to be crimped.
2) The terminal has two crimping position, i.e., cable core section and insulation section. Set the related crimp heights to the required values following the steps of procedure described below.

① Adjusting the cable core crimp height

* Set wire disk ① and spacer disk ② respectively to "A," and "W."
  (Turn the disks so that the predetermined setting positions are brought to the front.)
* Carry out crimping. Measure the cable core crimp height using a point blade micrometer to check the difference between the required height and the measured height.
* Set the position of wire disk ① and that of spacer disk ② within the range of the required crimp heights using the values given below as reference.
* For wire disk ①, the crimp height is reduced in the order of A, B, C and D in increments of approximately 0.12 mm.
* For spacer disk ②, the crimp height is reduced in the order of W, X, Y and Z in increments of approximately 0.03 mm.

② Adjusting the insulation crimp height

* Set insulation crimp height adjusting dial ③ to "1."
  (Turn the dial so that the predetermined setting position is brought to the top.)
* If you pull up insulation crimp height adjusting dial ③, you can turn it.

(Caution) Dial ③ incorporates a spring. If you release the dial, it will automatically return to its home position. It is necessary, however, to check that the dial has properly returned to the home position.

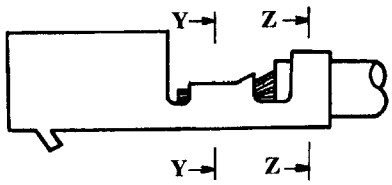
* Carry out crimping. Measure the insulation crimp height and check the difference between the required height and the measured height.
* Set the position of insulation crimp height adjusting dial ③ within the range of required crimp heights using the values given below as reference.
* For insulation crimp height adjusting dial ③, the crimp height is reduced in the order of 1, 2, 3 to 7 and 8 in increments of approximately 0.1 mm for white numerals or approximately 0.05 mm for blue numerals.

(Caution) Once you have completed the adjustment of the positions of the all disks and dials, carry out crimping again to be sure that each crimp height satisfies the requirements.

5. Crimping quality

5-1. Crimping conditions

Refer to the "Crimping condition tag" issued by us for the crimp height and tensile strength.



Cable core crimp height

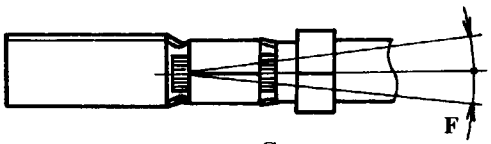
Cross section YY

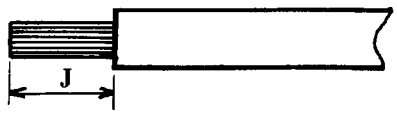
Covering crimp height

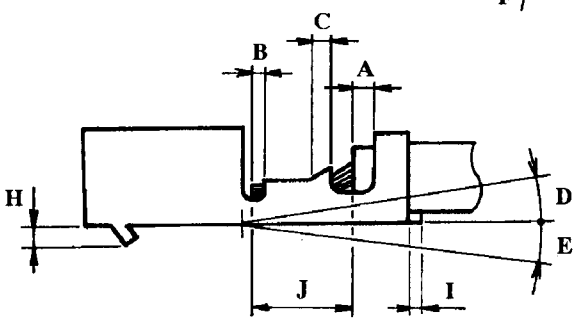
Cross section ZZ

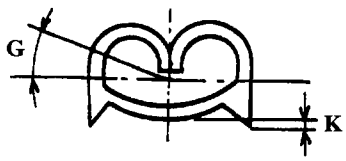
5-2. Crimping quality standards

Refer to the "Crimping quality standards" issued by us for the crimping quality.









Cross section of crimped section

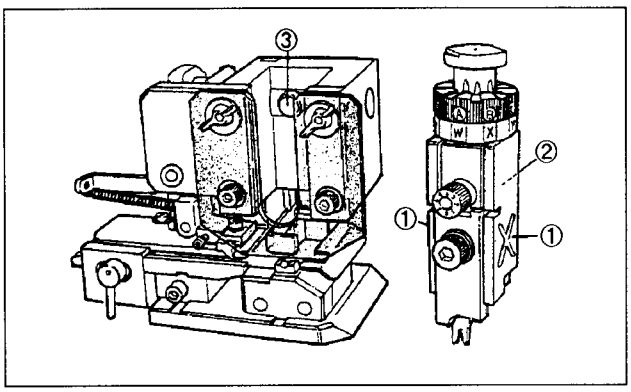
Item	Spot
Covered portion	A
Top portion of cable core	B
Bell-mouth	C
Bent-up	D
Bent-down	E
Twist	F
Rolling	G
Rance height	H
Cut-off tab	I
Stripping length	J
Crimp burr height	K

6. Maintenance

Caution :

1. **To prevent possible accidents caused by unfamiliarity with the operation of the machine, repair and adjustment of the machine shall be conducted only by maintenance personnel who has a full knowledge of the machine. Any repair and adjustment beyond the range covered by the instructions given in this Instruction is prohibited. We assume no responsibility for accidents caused by improper repair or adjustment or the use of non-genuine part(s).**
2. **To conduct maintenance works, be sure to detach the applicator from the crimping machine prior.**

(1) Lubrication

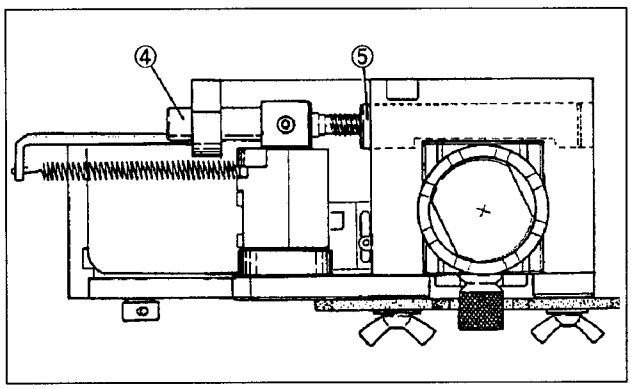


(1)-1. Sliding section of the ram

1) Periodically once a week, apply a light coating of grease to side face ①, rear face ② and cam follower section ③ of the frame.

Designated grease = NLGI No. 2 grease for centralized lubrication

(Caution) Avoid excessive oiling.



(1)-2. Sliding section of the terminal feed mechanism

1) Periodically once a week, apply a few drops of oil to feed rod ④ and adjust rod ⑤.

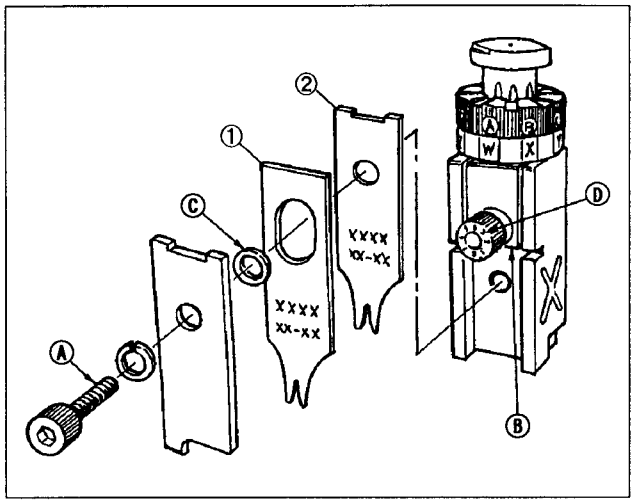
Designated oil = ISO VG32

(Caution) Avoid excessive oiling.

(2) Routine maintenance and inspection

1) Check to be sure that no carrier chips and dust gather in each sliding section.
2) It is recommended to store the machine, when not in use, in a clean and dry place to avoid dust and dirt.
3) To put the machine into service, be sure to check in prior that proper expendable parts are installed on the machine.

(3) Replacing the expendable parts

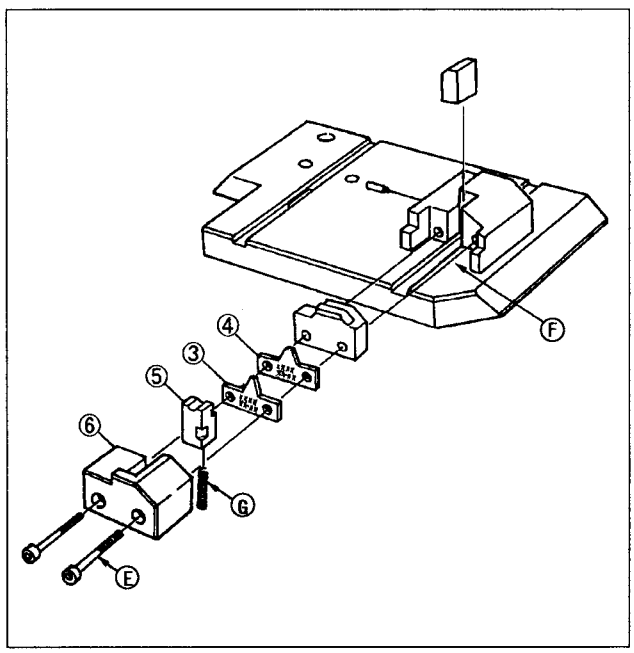


(3)-1. Replacing the crimper

1) Remove crimper mounting bolt Ⓐ and detach each part of the crimper.
2) Set the respective parts of the crimper in position following the correct order and secure them with crimper mounting bolt Ⓐ. At this time, be sure to check that the crimper is closely fitted against top surface Ⓑ or the ram holder.

(Caution) **Set each crimper that the side on which indications are given faces toward the operator.**

Be sure to remember to put insulation spacer Ⓒ in insulation crimper ①. If not, the adjustment using crimp height adjusting dial Ⓓ will be rendered ineffective.



(3)-2. Replacing the anvil

1) Remove two anvil mounting bolts Ⓔ and detach each part of the anvil.
2) Set the respective parts of the anvil in position following the correct order and secure them with two anvil mounting bolts Ⓔ. At this time, be sure to check that the anvil is closely fitted against base plate Ⓕ.

(Caution) **Set each anvil that the side on which indications are given faces toward the operator.**

Extra caution is needed at the time of attaching the anvil since cut-off punch ⑤ applies a lifting force by means of its spring Ⓖ.

(4) Expendable parts

Parts ① to ④ have inscribed marks. Specify HRS code according to the "Spare part mounting table" supplied with the applicator when ordering. Attach each part to the machine so that the inscribed number appearing on the part faces toward the operator.

No.	Product name
①	Insulation crimper
②	Wire crimper
③	Insulation anvil
④	Wire anvil
⑤	Cut-off punch
⑥	Cut-off die

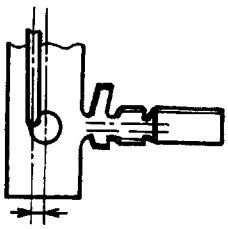
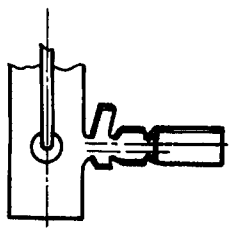
7. Troubleshooting

Before starting troubleshooting, the following has to be checked.

1) Are the correct crimpers and anvils attached?
2) Is the applicable terminal used?
3) Is the electric cable that falls within the applicable range used?

(1) Troubles with respect to functions of the applicator

Caution :
To carry out troubleshooting, be sure to detach the applicator from the crimping machine in prior.

Trouble	Cause	Corrective measure
1. The terminal is not fed smoothly. The terminal is not fed.	1. The feed finger is mounted out of position and is not aligned with the center of the pilot hole. 	1. Re-adjsut the mounting position of the feed finger. 
	2. Top of the feed finger has worn out.	2. Replace the feed finger with a new one.
	3. Cam follower has worn out.	3. Replace the cam follower with a new one.
2. Terminal deforms to take S-shape during clamping.	1. Scrap guard is attached to a wrong position and comes in contact with the reel terminal carrier.	1. Re-adjust the attaching position of the scrap guard.
	2. Cut-off punch has scratches and marks, impairing smooth up- and-down movement of the terminal.	2. Replace the cut-off punch with a new one.

(2) Troubles with respect to crimping quality

Caution :
To carry out troubleshooting, be sure to detach the applicator from the crimping machine in prior.

Trouble	Cause	Corrective measure
1. Crimp shape is defective. (Bent-up and bend-down)	1. Anvil and shear plate are improperly attached and fail to be closely fitted against the base plate.	1. Re-attach the anvil and shear plate properly.
	2. Crimper has worn out (broken) to cause the terminal to bite. After the completion of crimping, the terminal deforms when wiping off the terminal with the wire stopper. (Bent-down)	2. Replace the crimper with a new one. At this time, it is recommended to replace also the anvil with a new one since it is supposed that the anvil has also worn out.
2. Crimp shape is defective. (Twist or rolling)	1. Terminal is attached to a position that is not aligned with the center of the anvil.	1. Re-adjust the position of the terminal referring to "4-3. (2) How to adjsut the position of the terminal."
3. Crimp shape is defective. (Scratches and peel-off of plating)	1. Crimper has extraordinarily worn out (breakage and scratches).	1. Replace the crimper with a new one.
4. Crimp shape is defective. (Burrs)	1. Anvil has extraordinarily worn out (breakage and scratches).	1. Replace the anvil with a new one.

Contact our Production Engineering Department for consultation or questions with respect to any trouble other than those described above.

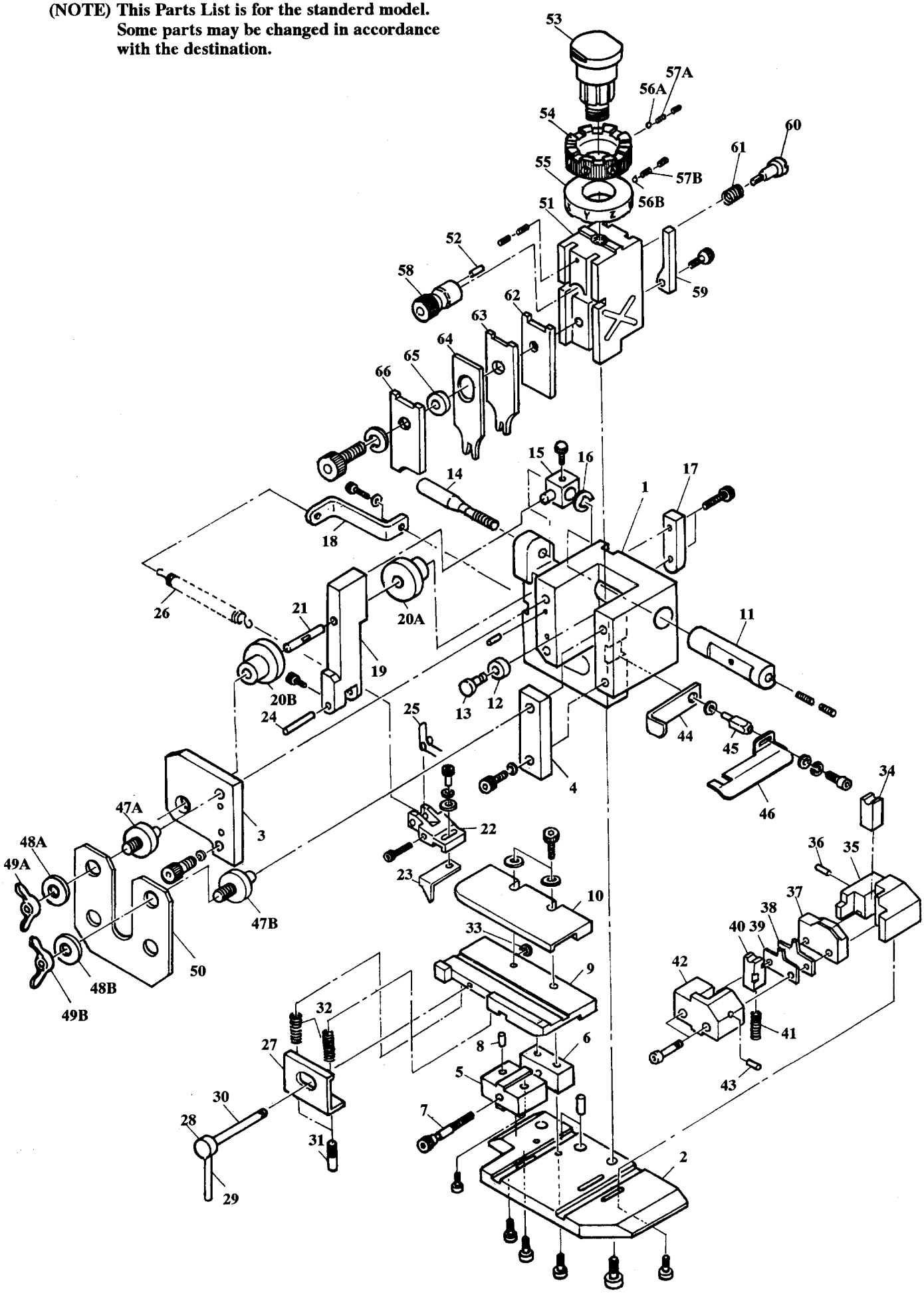
8. Appendix

(1) Major component names

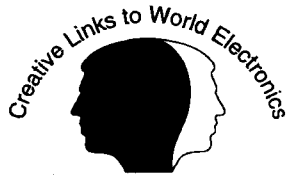
Item	Product name	Q'ty	Item	Product name	Q'ty
1	Frame	1	35	Anvil holder	1
2	Base plate	1	36	Anvil holder pin	1
3	Mounting plate (A)	1	37	Shear plate	1
4	Mounting plate (B)	1	38	Wire anvil	1
5	Adjust block (A)	1	39	Insulation anvil	1
6	Adjust block (B)	1	40	Cut-off punch	1
7	Adjust screw	1	41	Cut-off punch spring	1
8	Adjust block pin	1	42	Cut-off die	1
9	Terminal guide	1	43	Cut-off die pin	1
10	Terminal rail	1	44	Wire stopper	1
11	Feed rod	1	45	Stud bolt	1
12	Feed roller	1	46	Scrap guard	1
13	Roller pin	1	47	Safety cover bolt	2
14	Adjust rod	1	48	Safety cover washer	2
15	Pivot block	1	49	Safety cover thumb screw	2
16	Retaining ring (A)	1	50	Safety cover	1
17	Guide plate	1	51	Ram	1
18	Spring anchor	1	52	Ram pin	1
19	Feed lever	1	53	Shank	1
20	Pivot bush	2	54	Wire disk	1
21	Pivot pin	1	55	Spacer disk	1
22	Finger holder	1	56	Disk ball	2
23	Feed finger	1	57	Disk spring	2
24	Feed finger pin	1	58	Insulation crimp height adjusting dial	1
25	Feed finger spring	1	59	Feed cam	1
26	Feed spring	1	60	Shoulder screw	1
27	Drug stock	1	61	Shoulder spring	1
28	Cam boss	1	62	Crimper spacer	1
29	Cam lever	1	63	Wire crimper	1
30	Cam shaft	1	64	Insulation crimper	1
31	Drag stock bolt	2	65	Insulation spacer	1
32	Drag stock spring	2	66	Actuator	1
33	Retaining ring (B)	1			
34	Dummy	1			

Applicator Model AP105

(NOTE) This Parts List is for the standerd model. Some parts may be changed in accordance with the destination.



MEMO



HRS®

HIROSE ELECTRIC CO.,LTD.

5-23, OSAKI 5-CHOME, SHINAGAWA-KU, TOKYO 141, JAPAN
TELEX: J2468237 HRSELE TELE FAX: 03-3493-2933
CABLE: BESELECONHIROSE TOKYO, PHONE: 03-3491-9741

Hirose Electric (U.S.A.), Inc.	2688 Westhills Court, Simi Valley, Calif. 93065-6235	Phone : (805) 5227958 Tele-Fax : (805) 5223217
Hirose Electric GmbH	Zeppelinstraze 42 73760 Ostfildern-Kemnat	Phone : 0711-4560021 Tele-Fax : 0711-4560729
Hirose Electric UK Ltd.	Crownhill Business Centre, 22, Vincent Avenue, Crownhill, Milton Keynes, MK8 0AB	Phone : (0908) 260616 Tele-Fax : (0908) 563309
HIROSE KOREA Co., Ltd.	472-5, Mok Nae-Dong, Ansen-City Seoul	Phone : (02) 864-5075 Tele-Fax : (0345) 491-9886
Hirose Electric Co., Ltd., Hong Kong Branch	2102 Emperor Group Center, 288 Hennessy Road, Wanchai	Phone : 2803-5338 Tele-Fax : 2591-6560

© 96 . 11 Printed in Japan

Instruction Manual Number	
TAD-P0504	
Date of issue	November 1996
Date of revision	
Edition number	First edition

CAUTION

(1) No part of this manual may be reproduced without the permission of Hirose Electric Co., Ltd.

(2) Description in this manual is subject to change without notice.

(3) This Instruction Manual has been prepared for clarify. Should you find any unclear portion, error, or omission, please, for the safety of other, contact our Marketing Department.

(4) It should be understood that, notwithstanding the aforementioned item (3), we assume no liability to any claim for loss or failure to earn profit resulting from the use of the machine.

(5) We assume no responsibility for any damage resulting from your improper use of the machine including your failure to follow the instructions given in this Instruction Manual. This includes repair or modification conducted by any third party other than Hirose Electric Co., Ltd.

(6) Please note that servicing of the machine is not available in any country other than Japan.

HIROSE ELECTRIC CO., LTD. 1996